

CLAIMS

WHAT IS CLAIMED IS:

1. A radio frequency module, comprising:

a semiconductor having a front surface and a rear surface; and

a high frequency circuit having at least one active device and input/output signal lines formed on the front surface of the semiconductor, said input/output signal lines being routed through at least one signal-line via hole to the rear surface of said semiconductor, wherein at least a first grounding via hole is formed near said at least one signal-line via hole, wherein said at least one signal-line via hole and said first grounding via hole form microstrip lines.

2. The radio frequency module according to Claim 1, wherein at least a second grounding via hole is provided near said active device.

3. The radio frequency module according to Claim 1, wherein said active device is a multi-finger electrode structure and further wherein grounding electrodes of said multi-finger electrodes are connected

to the rear surface of said substrate through at least the second grounding via hole.

4. The radio frequency module according to Claim 2, wherein said active device is a multi-finger electrode structure and further wherein grounding electrodes of said multi-finger electrodes are connected to the rear surface of said substrate through at least the second grounding via hole.

5. The radio frequency module according to Claim 1, wherein the sum of the length of any one of said at least one signal-line via hole and twice the distance between said at least one signal-line via hole and the first grounding via hole is shorter than the length of said first grounding via hole.

6. The radio frequency module according to Claim 4, wherein the sum of the length of any one of said at least one signal-line via hole and twice the distance between said at least one signal-line via hole and the first grounding via hole is shorter than the length of said first grounding via hole.

7. The radio frequency module according to Claim 1, wherein the impedance of the microstrip lines is set to a value that is approximately the same as the characteristic impedance of said input/output signal lines.

8. The radio frequency module according to Claim 6, wherein the impedance of the microstrip lines is set to a value that is approximately the same as the characteristic impedance of said input/output signal lines.

9. The radio frequency module according to Claim 1, wherein both said at least one signal-line via hole and the first grounding via hole are rectangular micro via holes with a width of 20 μm or less.

10. The radio frequency module according to Claim 3, wherein both said at least one signal-line via hole and the first grounding via hole are rectangular micro via holes with a width of 20 μm or less.

11. The radio frequency module according to Claim 8, wherein both said at least one signal-line via hole and the first grounding via hole are rectangular micro via holes with a width of 20 μm or less.

12. The radio frequency module according to Claim 1, wherein the rear surface of the substrate includes signal-line areas through which the signal line via holes extend and grounding areas through which the first and second grounding via holes extend, further wherein said rear surface is covered with metal except in boundary zones between the signal-line areas and the grounding areas.

13. The radio frequency module according to Claim 3, wherein the rear surface of the substrate includes signal-line areas through which the signal line via holes extend and grounding areas through which the first and second grounding via holes extend, further wherein said rear surface is covered with metal except in boundary zones between the signal-line areas and the grounding areas.

14. The radio frequency module according to Claim 8, wherein the rear surface of the substrate includes signal-line areas through which the signal line via holes extend and grounding areas through which the first and second grounding via holes extend, further wherein said rear surface is covered with metal except in boundary zones between the signal-line areas and the grounding areas.

15. The radio frequency module according to Claim 11, wherein the rear surface of the substrate includes signal-line areas through which the signal line via holes extend and grounding areas through which the first and second grounding via holes extend, further wherein said rear surface is covered with metal except in boundary zones between the signal-line areas and the grounding areas.

16. The radio frequency module according to Claim 1, wherein the rear surface of said semiconductor substrate is covered with solder metal which is further covered with a barrier metal lamination for diffusion prevention.

17. The radio frequency module according to Claim 13, wherein the rear surface of said semiconductor substrate is covered with solder metal which is further covered with a barrier metal lamination for diffusion prevention.

18. The radio frequency module according to Claim 14, wherein the rear surface of said semiconductor substrate is covered with solder metal which is further covered with a barrier metal lamination for diffusion prevention.

19. A transceiver, comprising:

a semiconductor having a front surface and a rear surface; and

a transceiver circuit including input/output signal lines formed on the front surface of the semiconductor, said input/output signal lines being routed through at least one signal-line via hole to the rear surface of said semiconductor, wherein at least one grounding via hole is formed near said signal-line via holes, wherein said signal-line via holes and said grounding via holes form microstrip lines.

20. A sensor, comprising:

a semiconductor having a front surface and a rear surface; and

a high frequency sensor circuit including input/output signal lines formed on the front surface of the semiconductor, said input/output signal lines being routed through at least one signal-line via hole to the rear surface of said semiconductor, wherein at least one grounding via hole is formed near said signal-line via holes, wherein said signal-line via holes and said grounding via holes form microstrip lines.